

五 虫不可貌相

zhòng suǒ zhōu zhī, dì qiú shì wǒ men lài yǐ shēng cún de jiā yuán。 bàn suí chéng shì huà, rén kǒu zhú jiàn zēng zhǎng yǐ jí xiāo fèi néng lì de tí gāo。 huán bǎo gōng zuò yì yù xiǎn zhòng yào。 众所周知，地球是我们赖以生存的家園。伴随城市化、人口逐渐增长以及消费能力的提高，环保工作亦愈显重要。

wèi shén me ne? gēn jù shù jù xiǎn shì, wǒ guó lā jī zǒng liàng zhú nián zēng jiā。 sòng qù lā jī tián mái chǎng huò fén huà lú de lā jī zhōng, chú yú jiù zhàn le lā jī zǒng liàng de 45 bā xiān。 为什么呢？根据数据显示，我国垃圾总量逐年增加。送去垃圾填埋场或焚化炉的垃圾中，厨余就占了垃圾总量的45巴仙。

rán ér, zhè zhǒng chǔ lǐ lā jī de fāng shì huì duì huán jìng dài lái èr cì wū rǎn。 然而，这种处理垃圾的方式会对环境带来二次污染。

zài jī yuán qiǎo hé xià, rén lèi fā xiàn le yì zhǒng duì rén lèi zhù yì xiāng dāng dà de kūn chóng。 tā bù jǐn bù xié dài bìng dú, bù dīng yǎo rén, gèng bú huì qīn rù rén lèi de jū zhù huán jìng。 yīn cǐ bèi chēng wéi "wán měi de kūn chóng", tā jiù shì hēi shuǐ méng。 在机缘巧合下，人类发现了一种对人类助益相当大的昆虫。它不仅不携带病毒，不叮咬人，更不会侵入人类的居住环境，因此被称为“完美、的昆虫”，它就是黑水虻。

hēi shuǐ méng shì fǔ shēng xìng kūn chóng。 zuì zǎo shòu dào guān zhù shì yīn wéi tā néng yǒu xiào de kòng zhì yě shēng jiā yíng de zhōng qún shù liàng。 jiā yíng wèi le bì miǎn tā men de yòu chóng yǔ hēi shuǐ méng de yòu chóng jìng zhēng, ér jiǎn shǎo zài hēi shuǐ méng yòu chóng qǔ shí de fèn duī shàng chǎn luǎ。 yīn cǐ, rén lèi fā xiàn hēi shuǐ méng fán yǎn de fèn duī fù jìn, jiā yíng de shù liàng tè bié shǎo。 黑水虻是腐生性昆虫。最早受到关注是因为它能有效地控制野生家蝇的种群数量。家蝇为了避免它们的幼虫与黑水虻的幼虫竞争，而减少在黑水虻幼虫取食的粪堆上产卵。因此，人类发现黑水虻繁衍的粪堆附近，家蝇的数量特别少。

Don't judge an insect by its appearances

As we all know, the earth is the home we live in. With urbanization, population growth and increasing purchasing power, environmental protection is becoming more and more important.

Why? According to the data, the total amount of rubbish in our country is increasing year by year. Food waste accounts for 45 percent of the waste sent to landfills or incinerators. However, this way of disposing of rubbish will bring around secondary pollution to the environment.

By chance, humans have discovered a type of insect that benefits humans. Not only that they do not carry viruses, but they also do not bite/sting people, and do not even invade into human's living environment, hence they are called the "perfect insect". They are the black soldier fly.

Black soldier flies are saprophytic insects (saprophytic means obtaining food by absorbing dissolved organic material). It first received attention because of its effectiveness in controlling wild housefly populations. To avoid competition between their larvae and black soldier fly larvae, houseflies lay fewer eggs on dung piles where black soldier fly larvae feed. Therefore, humans have found that the number of houseflies is significantly smaller near dung piles where black soldier flies breed.

hēi shuǐméng de shēngmìngzhōu qī yuē èr shí bā tiān yòuchóng qī dà yuē shí bā tiān yòu
黑水虻的**生命周期**约二十八天，幼虫期大约十八天。幼
chóng zài shì dāng de wēn dù shī dù xià biànnéng cún huó ér jī hū suǒ yǒu nóng yè yǒu jī zī yuán
虫在适当的温度、湿度下便能存活，而几乎所有农业有机资源，
rú shí wù zā zǐ dòng wù fèn biàn yǐ jí tú zǎi chǎng de xià jiǎo liào dōu shì tā men de shí wù
如：**食物渣滓**、**动物粪便**以及**屠宰场**的下脚料都是它们的食物。
jù yán jiū xiǎn shì yī kè hēi shuǐméng de luǎnzhang dà chéngchóng de guòchéng néng kěn shí dà yuē
据研究显示，一克黑水虻的卵长大成虫的过程，能啃食大约
bā gōng jīn de chú yú shǐ dé yuánběn xū yào hào shí hào lì chǔ lǐ de fèi liào zài tā de fēn jiě
八公斤的厨余，使得原本需要耗时耗力处理的废料，在它的分解
xià shěng què xǔ duō chǔ lǐ de fèi yòng
下，省却许多处理的**费用**。

chú le fēn jiě chú yú hēi shuǐméng yòuchóng yě shì hěn hǎo de dàn bái zhì lái yuán kě yòng
除了分解厨余，黑水虻幼虫也是很好的**蛋白质**来源，可用
lái wèi shí jī zhū děng jiā chù dāng tā pò yǒng yǔ huàchéngchóng yǒng ké zhōng suǒ hán de chéng fèn
来喂食鸡猪等**家畜**。当它破蛹羽化成虫，蛹壳中所含的成分
bù zhǐ shì hé yú zuò chǒng wù sì liào de tiān jiā cái liào jiān zhī kě zhì chéng yòng yú gōng yè nóng
不只适合于做宠物饲料的添加材料，兼之可制成用于工业、农
yè yī yào měi róngděng lǐng yù de yuán liào cǐ wài hēi shuǐméng de fèn biàn kě zuò yǒu jī fēi
业、医药美容等领域的**原料**。此外，黑水虻的粪便可做**有机肥**，
gǎi liáng tǔ rǎng de pǐn zhì tí gāo nóng rén xīn kǔ gēng yún de zuò wù chǎn liàng yǔ huà hòu de hēi shuǐ
改良土壤的品质，提高农人辛苦耕耘的作物产量。羽化后的黑水
méng bú zài jìn shí jīn kào shuǐ wéi chí shēng mìng zhè shí nóng rén jiù huì zhǔn bèi zú gòu de kōng
虻不再进食，仅靠水维持生命。这时，农人就会准备足够的空
jiān ràng hēi shuǐméng jiāo pèi yǔ chǎn luǎn xíng chéng yí gè yǎng zhí de xún huán liú chéng
间让黑水虻交配与产卵，形成一个**养殖**的循环流程。

The **life cycle** of the black soldier fly is about 28 days, and the larval stage is about 18 days. Larvae can survive under the right temperature and humidity, and almost all agricultural organic sources, such as: **food waste**, animal faeces and **slaughterhouse** waste, are their food. According to research, one gram of Black Soldier Fly's eggs can eat about eight kilograms of kitchen waste during the process of growing into adults. This saves a lot of processing costs by decomposing waste this way that would otherwise require a lot of time and effort and thus reducing **expenses**.

In addition to decomposing food waste, black soldier fly larvae are also a good source of **protein**, which can be used to feed **livestock** such as chickens and pigs. When it breaks out of the pupa and emerges as an adult, the ingredients contained in the **pupal shell** are not only suitable as additives for pet feed, but also can be made into **raw materials** for end products in the heavy industry, agriculture, medical and beauty sectors. In addition, the faeces of the black soldier fly can be used as **organic fertilizer** to improve the quality of the soil and increase the yield of crops that farmers work so hard on. Once reach adulthood, Black Soldier Flies no longer eat, and only survive on water. At this time, farmers will prepare enough space for black soldier flies to mate and lay eggs, forming a **breeding** process and cycle.

rú jīn yǒu xiē guó jiā bǎ hēi shuǐméng dài jìn xué xiào tì xiào yuán jiě jué chú yú wèn tí
如今，有些国家把黑水虻带进学校，替校园解决厨余问题。
zhè yàng shí táng měi tiān de shí wù cán zhā jiù yǒu le xīn qù chù xiào fāng bǎ yú cài gòngshēng yǔ
这样，食堂每天的食物残渣就有了新去处。校方把鱼菜共生与
hēi shuǐméng yǎng zhí xì tǒng xiāng jié hé shǒu xiān jiāng chú yú dǎo jìn dà tǒng lǐ yòng lái yǎng hēi
黑水虻养殖系统相结合：首先，将厨余倒进大桶里，用来养黑
shuǐméng yòu chóng guò duàn rì zi jí jiāng huà yǒng de yòu chóng huì tōng guò shuǐ guǎn diào jìn yú chí
水虻幼虫。过段日子，即将化蛹的幼虫会通过水管掉进鱼池，
yòng yǐ wèi yú zhī hòu yòng chí shuǐ lái zhòng zhí shuǐ gēng cài hēi shuǐméng xiāo huà hòu pái chū de
用以喂鱼；之后，用池水来种植水耕菜。黑水虻消化后排出的
yè tǐ hái yǒu qū chóng de xiào guǒ
液体，还有驱虫的效果。

cóng yǐ shàng lì zǐ kě zhī zhuān yè rén yuán shàn yú lì yòng hēi shuǐméng lái fēn jiě fèi qì wù
从以上例子可知，专业人员擅于利用黑水虻来分解废弃物，
ràng hēi shuǐméng chéng le lián jià de sì liào lái yuán dà fú jiàng dī le cóng yè zhě de yǎng zhí fù dān
让黑水虻成了廉价的饲料来源，大幅降低了从业者的养殖负担。
tā de guǎng fàn shǐ yòng jì fú hé jīng jì xiào yì yòu kě yǐ shǐ zī yuán zài xún huán lì yòng yīn
它的广泛使用既符合经济效益，又可以使资源再循环利用，因
cǐ chēng zhī wéi xīn xīng zī yuán yì diǎn er yě bù wéi guò
此称之为新兴资源，一点儿也不为过。

yīn qiè qī pàn rén men zài wèi lái néng gèng shàn yòng hēi shuǐméng wéi bǎo hù zì rán huán jìng
殷切期盼人们在未来，能更善用黑水虻，为保护自然环境
kāi pì gèng duō tú jìng
开辟更多途径。

Nowadays, some countries bring black soldier flies into schools to solve the food waste problem. In this way, the daily food scraps in the canteens have a new place to go. The schools combined rearing of fish, planting of vegetable and the breeding of black soldier flies breeding into a symbiotic system: first, kitchen waste was poured into a large pot to raise black soldier fly larvae. After a while, the larvae that are about to pupate will fall into a fish pond through the water pipe to feed the fish; later, the pond water will be used to grow hydroponic vegetables. The liquid excreted by black soldier flies after digestion also has the effect of repelling insects.

From the above examples, we can see that professionals are good at using black soldier flies to decompose waste, and using them a cheap source of animal feed that greatly reduces the cost of rearing them. Their widespread usage is not only economically beneficial, but also enables resource recycling. Hence it is not an exaggeration to call it an 'emerging resource'.

Let's earnestly hope that people will make better use of black soldier flies in the future and open up more ways to protect the natural environment.